

BOOK REVIEWS

The Flies of Western North America, by Frank R. Cole (with the collaboration of Evert I. Schlinger), 1970. xi 693 pp. University of California Press, Berkeley, California. Cloth, \$25.00.

This large work is essentially a compilation from the literature—only a few families such as the Acroceridae and Cecidomyidae were revised especially for the work. The lengthy introduction defines the area studied and discusses its ecology, biogeography, life zones, etc. There is also a short section on Geologic history and a lengthy discussion of general anatomy. The key to families is modified from that in Brues and Melander (1932). Each family treatment contains keys to subfamily (if necessary) and to genera. Under each genus the original citation is given and there is a listing and some discussion of the western species which fall in that particular genus. There are no keys to species and it would be very difficult to identify species with this work. The illustrations, particularly the full figures by Dr. Cole, are very good and are well reproduced. A great many are reproduced from Curran's Manual.

This book was many years in preparation and consequently some of the families or subgroups have been more recently revised but this would be true of any compilation of this kind. Since the source of each key is given the reader can refer back to the original work and is aware of the date of the key in question.

One unfortunate error has occurred in the table (p. 100) comparing the Townes—Johannsen classification of the Chironomidae with that of Freeman. The lines below Limnophyes through Tanytarsus in the second column do not correspond to their equivalents in column 1. The reader should consult the table on p. 143 of the Catalogue of North American Diptera.

The closing sections of the volume consist of a glossary, selected bibliography and an index to families, subfamilies, tribes, genera, and species.

SELWYN S. ROBACK

Philadelphia Academy of Natural Sciences

Biology of Termites. Volume 1. Kumar Krishna and Frances M. Weesner (eds.). Academic Press, New York. 1969. 597 pp. \$32.00.

Drs. Krishna and Weesner have combined their talents with those of 13 other experts (representing 5 countries) to produce this volume on the biology and behavior of termites.

In an introductory chapter, Dr. Krishna outlines Isoptera classification, one which draws heavily upon the work of the two most noted researchers on termites: A. E. Emerson and T. E. Snyder.

Dr. Weesner in Chapter 2 presents such clear diagrams of the external anatomy that they could serve as an introductory entomology textbook. He describes in Chapter 5 the anatomy and physiology of the reproductive systems representative of different castes.

The digestive system is described in Chapter 3 by Drs. Noirot and Noirot-Timothee. They present a comprehensive anatomical review and discuss the physiology of digestion.

Dr. Noirot reminds us in Chapter 4 how fragmentary our knowledge is concerning the source and role of many exocrine secretions. In Chapter 10 he treats caste differentiation in Termitidae, where postembryonic development is stereotyped and less reversible than in other families.

The nervous system and sense organs are described by Dr. Richard in Chapter 6. He has illustrated it with beautiful model reconstructions of termite brains.

In Chapter 7 Dr. A. Stuart discusses the role of foraging, trail following, nest construction, colony odor, and alarm reactions in colony organization and draws heavily from his own

studies. Only a few cursory references are made to the work on corresponding aspects of the social organization of ants.

Flight and the foundation of colonies is discussed in Chapter 9 by Dr. W. Nutting. Emphasis is on the flight season and the diverse factors that regulate flight. The sections on postflight behavior overlap somewhat with a similar section on sexual behavior in the preceding chapter, but each enhances the other.

In Chapter 9, Dr. E. Miller reviews the physiology of caste determination in lower termites (i.e., *Hodotermitidae*, *Kalotermitidae* and *Rhinotermitidae*). He presents evidence that newly hatched larvae are equipotent, with their future castes determined by social (mainly pheromonal) and environmental factors.

Of particular interest is Chapter 11 by G. Becker on rearing termites in the laboratory. Sections on nutrition, aeration, humidity, temperature, disease and the prevention of termites' escape from laboratory nests, include illustrations of many types of apparatus.

In Chapter 12 Dr. E. McMahan discusses the feeding relationships and the use of radioisotopes in monitoring food exchange.

Biochemical studies are presented in Chapter 13. Dr. B. Moore discusses the digestion of cellulose, the chemistry of pigments, vitamin and lipid metabolism, and the chemistry of pheromonal secretions.

Water relationships are the subject of Chapter 14. Dr. M. Collins examines factors influencing survival time during experimental desiccation.

Chapter 15 describes the introduction of termite species into new countries. In a nine-page table, Dr. E. Gay lists 42 species that have been introduced into new areas, their countries of origin and introduction, and their present ecological status.

In Chapter 16 Dr. W. Sands reviews the mutualistic, saprophytic and pathogenic associations between termites and fungi.

The last chapter (17) is a discussion by Dr. D. Kistner of the biology of termitophiles. He concludes that many termite guests have speciated "within the framework of the phylogentic pattern of their hosts."

HOWARD R. TOPOFF

The American Museum of Natural History

Review of the Mite Family Cheyletidae. Francis M. Summers and Douglas W. Price. Sept. 17, 1970. vi, 153 pp., 59 figs. University of California Publications in Entomology, **61**. Berkeley, Los Angeles, London: University of California Press. \$5.50 paperbound.

With some 50 genera and about 186 described species, the cheyletids are an important group of prostigmatic mites common throughout most of the world in granaries, barns and stables, in leaf litter and soil, and sometimes on plants. Though some are associated with birds and mammals, and even, on occasion, with insects, most are free-living predators on other small arthropods. Since E. W. Baker's review of the family in 1949, many new species have been discovered and much systematic work has been done, particularly by Volgin in Russia. Summers, who was for some time a member of the faculty at the College of the City of New York, has now for many years been Professor of Entomology at the University of California at Davis, and Entomologist at the Davis Experiment Station, where he has done much significant work in applied entomology. "The work in mite systematics," he writes (in correspondence), "is a sort of hobby because I have spent most of my efforts . . . on how to out-manage the insects and mites on peaches and almonds." Many of Summers' publications (including one in 1961 with his present collaborator Price, then a laboratory technician at Davis) have dealt with mites of the superfamily Raphignathoidea. The work here reviewed, according to the introduction, "evolved out of difficulties encountered by